

WHAT IS CLAIMED IS:

- 1 1. A method for enabling access to data, comprising:
 - 2 receiving a call from a client to invoke a remote interface method;
 - 3 accessing, with a remote interface implementation, parameters from the received call in
 - 4 response to the invocation of the remote interface method;
 - 5 generating a stored procedure call with the accessed parameters as input parameters of
 - 6 the stored procedure;
 - 7 transferring the stored procedure call to a stored procedure named by the call to
 - 8 execute;
 - 9 receiving output from the stored procedure;
 - 10 inserting the received output from the stored procedure into a data object; and
 - 11 returning the data object to the client.
- 1 2. The method of claim 1, wherein the stored procedure executes in a database server and generates the output, wherein the output is capable of comprising output that is a member of the set of output comprising one or more result sets of data from the database table and one or more output parameters resulting from stored procedure operations performed on data in the database table.
- 1 3. The method of claim 1, further comprising processing, with the remote interface implementation, an input mapping to determine the parameters in the client call to use as input parameters to the stored procedure call.
- 1 4. The method of claim 1, further comprising:
 - 2 receiving the stored procedure output after the stored procedure program completes
 - 3 execution.

1 5. The method of claim 1, further comprising processing an output mapping
2 indicating how the stored procedure output is mapped to the data object.

1 6. The method of claim 5, wherein the output is capable of including result sets
2 and parameters, wherein the output mapping indicates an order in which the received result sets
3 and parameters are added to the data object

1 7. The method of claim 1, further comprising:
2 generating metadata describing the stored procedure output included in the data object;
3 and
4 adding the metadata to the data object.

1 8. The method of claim 7, further comprising:
2 processing, with the client, the metadata in the received data object to determine how
3 to access the stored procedure output from the data object.

1 9. The method of claim 7, wherein the data object is comprised of multiple
2 elements, wherein the stored procedure output includes rows of data from at least one result
3 set, wherein inserting the stored procedure output into the data object further comprises
4 inserting data from each column in each row in each result set to one element in the data object,
5 and wherein the metadata defines structure and types of data in each element.

1 10. The method of claim 7, wherein the data object is comprised of multiple
2 elements, and wherein the stored procedure output is capable of including multiple output
3 parameters, wherein inserting the stored procedure output into the data object further
4 comprises inserting each output parameter into one element in the data object, and wherein the
5 metadata provides information on structure and type of the data in each element.

1 11. The method of claim 1, wherein the client only receives one data object with
2 stored procedure output in response to the call.

1 12. The method of claim 1, wherein the remote interface implementation is
2 implemented as a Enterprise JavaBean and wherein the data object comprises a Java
3 serializable object.

1 13. A method for making stored procedure programs available to application
2 programs, comprising:

3 determining one stored procedure program generating output needed by one
4 application program;
5 generating a remote interface implementation to respond to a remote interface method
6 capable of receiving a call from the application program including data and invoking a stored
7 procedure in a database server with the data from the application program used as input; and
8 generating an output mapping for the remote interface implementation to use to
9 determine how to insert the stored procedure output into a data object that may be used by the
10 application program.

1 14. The method of claim 13, wherein the generated remote interface implementation
2 inserts metadata into the data object providing information on the stored procedure output
3 inserted into the data object.

1 15. A system for enabling access to data, comprising:
2 means for receiving a call from a client to invoke a remote interface method;
3 means for accessing, with a remote interface implementation, parameters from the
4 received call in response to the invocation of the remote interface method;

1 means for generating a stored procedure call with the accessed parameters as input
2 parameters of the stored procedure;
3 means for transferring the stored procedure call to a stored procedure named by the
4 call to execute;
5 means for receiving output from the stored procedure;
6 means for inserting the received output from the stored procedure into a data object;
7 and
8 means for returning the data object to the client.

1 16. The system of claim 15, wherein the stored procedure executes in a database
2 server and generates the output, wherein the output is capable of comprising output that is a
3 member of the set of output comprising one or more result sets of data from the database table
4 and one or more output parameters resulting from stored procedure operations performed on
5 data in the database table.

1 17. The system of claim 15, further comprising means for processing, with the
2 remote interface implementation, an input mapping to determine the parameters in the client call
3 to use as input parameters to the stored procedure call.

1 18. The system of claim 15, further comprising:
2 means for receiving the stored procedure output after the stored procedure program
3 completes execution.

1 19. The system of claim 15, further comprising means for processing an output
2 mapping indicating how the stored procedure output is mapped to the data object.

1 20. The system of claim 19, wherein the output is capable of including result sets
2 and parameters, wherein the output mapping indicates an order in which the received result sets
3 and parameters are added to the data object

1 21. The system of claim 15, further comprising:
2 means for generating metadata describing the stored procedure output included in the
3 data object; and
4 means for adding the metadata to the data object.

1 22. The system of claim 21, further comprising:
2 means for processing, with the client, the metadata in the received data object to
3 determine how to access the stored procedure output from the data object.

1 23. The system of claim 21, wherein the data object is comprised of multiple
2 elements, wherein the stored procedure output includes rows of data from at least one result
3 set, wherein the means for inserting the stored procedure output into the data object further
4 inserts data from each column in each row in each result set to one element in the data object,
5 and wherein the metadata defines structure and types of data in each element.

1 24. The system of claim 21, wherein the data object is comprised of multiple
2 elements, and wherein the stored procedure output is capable of including multiple output
3 parameters, wherein the means for inserting the stored procedure output into the data object
4 further inserts each output parameter into one element in the data object, and wherein the
5 metadata provides information on structure and type of the data in each element.

1 25. The system of claim 15, wherein the client only receives one data object with
2 stored procedure output in response to the call.

1 26. The system of claim 15, wherein the remote interface implementation is
2 implemented as a Enterprise JavaBean and wherein the data object comprises a Java
3 serializable object.

1 27. A system for making stored procedure programs available to application
2 programs, comprising:
3 means for determining one stored procedure program generating output needed by one
4 application program;
5 means for generating a remote interface implementation to respond to a remote
6 interface method capable of receiving a call from the application program including data and
7 invoking a stored procedure in a database server with the data from the application program
8 used as input; and
9 means for generating an output mapping for the remote interface implementation to use
10 to determine how to insert the stored procedure output into a data object that may be used by
11 the application program.

1 28. The system of claim 27, wherein the generated remote interface implementation
2 inserts metadata into the data object providing information on the stored procedure output
3 inserted into the data object.

1 29. An article of manufacture for enabling access to data by:
2 receiving a call from a client to invoke a remote interface method;
3 accessing, with a remote interface implementation, parameters from the received call in
4 response to the invocation of the remote interface method;
5 generating a stored procedure call with the accessed parameters as input parameters of
6 the stored procedure;

1 transferring the stored procedure call to a stored procedure named by the call to
2 execute;
3 receiving output from the stored procedure;
4 inserting the received output from the stored procedure into a data object; and
5 returning the data object to the client.

1 30. The article of manufacture of claim 29, wherein the stored procedure executes
2 in a database server and generates the output, wherein the output is capable of comprising
3 output that is a member of the set of output comprising one or more result sets of data from the
4 database table and one or more output parameters resulting from stored procedure operations
5 performed on data in the database table.

1 31. The article of manufacture of claim 29, further comprising processing, with the
2 remote interface implementation, an input mapping to determine the parameters in the client call
3 to use as input parameters to the stored procedure call.

1 32. The article of manufacture of claim 29, further comprising:
2 receiving the stored procedure output after the stored procedure program completes
3 execution.

1 33. The article of manufacture of claim 29, further comprising processing an output
2 mapping indicating how the stored procedure output is mapped to the data object.

1 34. The article of manufacture of claim 33, wherein the output is capable of
2 including result sets and parameters, wherein the output mapping indicates an order in which the
3 received result sets and parameters are added to the data object

1 35. The article of manufacture of claim 29, further comprising:
2 generating metadata describing the stored procedure output included in the data object;
3 and
4 adding the metadata to the data object.

1 36. The article of manufacture of claim 35, further comprising:
2 processing, with the client, the metadata in the received data object to determine how
3 to access the stored procedure output from the data object.

1 37. The article of manufacture of claim 35, wherein the data object is comprised of
2 multiple elements, wherein the stored procedure output includes rows of data from at least one
3 result set, wherein inserting the stored procedure output into the data object further comprises
4 inserting data from each column in each row in each result set to one element in the data object,
5 and wherein the metadata defines structure and types of data in each element.

1 38. The article of manufacture of claim 35, wherein the data object is comprised of
2 multiple elements, and wherein the stored procedure output is capable of including multiple
3 output parameters, wherein inserting the stored procedure output into the data object further
4 comprises inserting each output parameter into one element in the data object, and wherein the
5 metadata provides information on structure and type of the data in each element.

1 39. The article of manufacture of claim 29, wherein the client only receives one data
2 object with stored procedure output in response to the call.

1 40. The article of manufacture of claim 29, wherein the remote interface
2 implementation is implemented as a Enterprise JavaBean and wherein the data object
3 comprises a Java serializable object.

1 41. An article of manufacture for making stored procedure programs available to
2 application programs by:
3 determining one stored procedure program generating output needed by one
4 application program;
5 generating a remote interface implementation to respond to a remote interface method
6 capable of receiving a call from the application program including data and invoking a stored
7 procedure in a database server with the data from the application program used as input; and
8 generating an output mapping for the remote interface implementation to use to
9 determine how to insert the stored procedure output into a data object that may be used by the
10 application program.

1 42. The article of manufacture of claim 41, wherein the generated remote interface
2 implementation inserts metadata into the data object providing information on the stored
3 procedure output inserted into the data object.